fresh-water ponds by the drainage from the adjacent areas. The ponds subsequently became sphagnum bogs, with the usual succession of vegetation culminating in a white pine swamp. The weight of this forest submerged it in the quaking bog upon which it rested, killing the trees, and establishing more hydrophytic conditions. The white pines then reestablished themselves and dominated the area for a century, when the forest development was abruptly terminated by the influx of salt water caused by the subsidence of the region and the consequent breaking-through of the barrier reef. The duration of the marsh from the establishment of bog plants on the sphagnum to the present time is estimated at 420 years. —GEO. D. FULLER.

Studies in the rusts.—OLIVE has published abstracts[20] of two recent studies among the rusts. One deals with the conflicting statements of BLACKMAN and CHRISTMAN in reference to the sexual performance in the caeoma type of rusts. As a result of the study of several species of caeoma rusts, OLIVE confirms CHRISTMAN as to the fusion of two similar gametes by the development of a conjugation pore; but he also finds that the process may begin through a very small pore, so that the nucleus of the migrating protoplast may become stretched out or constricted, thus giving the appearance of BLACKMAN'S "nuclear migration." OLIVE also finds that the two gametes differ somewhat in time of development, and presents the observations on which this important conclusion is based.

The other study is concerned with the origin and relationships of the more compact, "cluster-cup" type of structure. It seems that large, irregular, multinucleate cells arise after the sexual fusion, and that the basal cells of the aecidiospore rows arise as the ultimate branches of these cells. Hence the cup structure is derived from a limited and deep-seated group of cells, and the peridium arises in consequence. OLIVE also suggests the method by which the aecidium-cup type may have originated from the simpler caeoma type, and concludes that the former type is the last member of the evolutionary series in this group.—J. M. C.

Endosperm of caprifigs.—LECLERC DU SABLON[21] has discovered that in those pistillate flowers of the caprifig in which Blastophaga has deposited eggs the endosperm develops, although fertilization has not occurred. Such endosperm he speaks of as parthenogenetic, and observes that it is digested by the larva in the same way that the normal endosperm is digested by the plant embryo, the destruction of the endosperm in both cases being complete. The parthenogenetic endosperm differs strikingly from the ordinary kind, in the absence of cellulose walls, dense cytoplasm, and very large, often irregular nuclei, which are variable in number. In the rare cases in which fertilization has occurred in a pistillate flower of the caprifig, endosperm identical with that of the "Smyrna fig" is formed, that

[20] OLIVE, E. W., The relation of "conjugation" and "nuclear migration" in the rusts. Science N. S. **27**:213. 1908.

———, The relationships of the aecidium-cup type of rust. *Idem* 214.

[21] SABLON, LECLERC DU, Structure et développement de l'albumen du caprifiguier. Rev. Gén. Botanique **20**:14–24. *pl. 6.* 1908.

is, with cellulose walls, relatively scanty cytoplasm, and small, solitary nuclei. The pistillate flowers of the caprifig in which there has been neither egg-deposition nor fertilization usually do not develop farther and become atrophied. The author thinks the conclusion to be inevitable that the "stimulus" produced by the presence of the egg and larva of Blastophaga does just what is usually accomplished by fertilization, in determining not only the development of endosperm but also the further growth of the ovule and of the pericarp, and the general form of the fig.—J. M. C.

Spore formation in Derbesia.—DAVIS[22] has published a paper treating of spore formation in Derbesia, one of the Siphonales. He studied the development of sporangia and the formation and germination of zoospores. The most interesting points of the paper are the results concerning the behavior of nuclei in the sporangium previous to the formation of zoospores. Many nuclei which do not take part in the formation of zoospores undergo degeneration. Plastids become arranged radially about the nucleus which survives the act of degeneration. Including the nucleus as a center, segmentation of protoplasm takes place to form the beginning of the zoospore; then the formation of the blepharoplast begins. Previous to the formation of the blepharoplast, the nucleus moves from near the center of the young zoospore toward the periphery. Granules around the nucleus seem to move toward the periphery, where they fuse with one another to form a ring which becomes the blepharoplast. DAVIS believes that the belepharoplast of Derbesia is not a development from the plasma membrane, but from the granules closely associated with the protoplasm investing the nucleus. The paper closes with a discussion of the cytology of the blepharoplast and the value of zoospores and gametes as taxonomic characters in Siphonales.—SHIGÉO YAMANOUCHI.

Gummosis.—RUHLAND, who had been working with the late Dr. R. ADERHOLD in the Imperial Biological Station at Dahlem upon the problem of the formation of gum, has published a preliminary paper upon the physiology of gum formation,[23] promising the full account later, with developmental and anatomical details, in the *Arbeiten* of the station. A part of the paper is devoted to a criticism of the latest theory, that of BEIJERINCK and RANT,[24] who hold that cytolytic substances issuing from the dead cells in the neighborhood of a wound cause the liquefaction of embryonal wood tissues, anomalously developed through the wound stimulus. RUHLAND, however, holds that, whenever such tissues are produced by wounding, it is the influence of the oxygen of the admitted air that determines a cessation of further division in these cells, because of the transfor-

[22] DAVIS, B. M., Spore formation in Derbesia. Annals of Botany **22**:1–20. *pls. 1, 2.* 1908.

[23] RUHLAND, W., Zur Physiologie der Gummibildung bei den Amygdaleen. Ber. Deutsch. Bot. Gessells. **25**:302–315. *figs. 3.* 1907.

[24] Wundreiz, Parasitismus, und Gummifluss bei den Amygdaleen. Centralbl. Bakt. II. **15**:366 ff.